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PROTECTION AND MANAGEMENT OF LAND RESOURCES : THE ELEMENTS OF AN INTEGRATED APPROACH

Report of the Secretary General

I. INTRODUCTION

1. The Preparatory Committee, at its second substantive session, in decision 2/11 on protection and management of land resources : (a) noted with satisfaction the Report of the Secretary General of the Conference on the protection and management of land resources (A/CONF.151/PC/24) and welcomed the proposals for the development of an integrated approach to the protection and management of land resources; (b) requested the Secretary General of the Conference to develop these proposals in greater depth for the third session of the Preparatory Committee, paying particular attention to: (i) developmental aspects, (ii) economic and social dimensions including land tenure; (iii) resources and financial aspects; and (iv) popular participation and in particular, the participation of women; (c) requested the Secretary General to take due account in its further work in this area of the relevant paragraphs of the Bergen Declaration, the Tlatelolco Platform on Environment and Development and the Final Declaration adopted by the Ministerial Conference on Environment and Development for Asia and the Pacific as well as the results of the Regional Conference for Africa, organized in accordance with General Assembly Resolution 44/228, Section II, paragraph 13 and decision I of the Preparatory Committee at its organizational session.

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2. As a preliminary step, it would therefore be useful to recall the results of the regional conferences, highlighting the points that are most relevant for the issue of land resources:

(i) The Bergen Declaration highlights the importance of the "precautionary principle", in which "environmental measures must anticipate, prevent and attack the causes of environmental degradation", and stresses that it is necessary to "integrate environmental considerations with economic and sectoral planning policies"...and to ...expand "sustainable development decision making and accountability" and the "extensive use of economic instruments in conjunction with a balanced mix of regulatory approaches". Finally, the Declaration emphasizes the "importance of public participation".

(ii) The Tlatelolco Platform states that "the protection and management of land resources should focus on an integral, forward looking and long term environmental planning and management, based on the principles of environmental and developmental integration and public utility". It also indicates that "plans for specific resources, areas or activities should be focused on and adjusted to the main lines of national environmental management and economic plans, and should thus serve as a guideline for the harmonious occupation of the national territory".

(iii) The Final Declaration of the Ministerial Conference on Environment and Development for Asia and the Pacific stresses the adoption of an integrated approach to environment and development and the adoption of the precautionary principle. The Regional Strategy on Environmentally Sound and Sustainable Development associated to the Declaration calls for integration of environmental parameters and national economic policies, backed by the appropriate institutions and management systems.

(iv) The results of the Regional Conference for Africa were not available at the time of writing this report.

3. All these points have been taken into account by the Secretary General in preparing this document. It is arranged in two substantive sections:

(i) a brief review of the main issues and linkages involved in managing land resources;

(ii) a review of the various elements that can form the basis for an integrated approach to the protection and management of land resources.

4. In preparing this report, the Secretariat of the Conference worked in collaboration with the relevant agencies of the United Nations System. Publication and other material provided by them, in particular by FAO, UNEP and the World Bank were used extensively, and comments and suggestions received were duly incorporated. In addition, the advice and views of various other concerned organizations and experts was sought.

II. THE MAIN ISSUES CONCERNING LAND RESOURCES

5. It might be useful to recall and elaborate on the main ideas and issues concerning an integrated approach to the management of land resources as they were initially defined (A/CONF.151/PC/24), because they provide the context within which the concepts can be given an operational dimension.

Definition of land and its uses

6. Land is normally defined as a physical entity, in terms of its topography, dimensions and spatial nature; a broader integrative view also includes natural resources: the soils, minerals, water and biota that the land comprises. The biota includes plants, animals and microorganisms in all their diversity. These components are organized in ecosystems which provide a variety of services essential to human beings, such as the breakdown of wastes; the formation of soils or the moderation of water flows; the pollination of plants. Land and land related processes are also an important component of the global cycles and biogeochemical processes, and as such, linked to global climate and other atmospheric phenomena.

7. The uses to which land is put can be divided into three broad categories: as ecosystems, as a producer of raw materials, as space. Thus, a broad range of economic activities is implicated, including primary activities such as agriculture, pastoral production, forestry, fisheries, all of which depend utterly on environmental services and resources for their existence; mining and energy extraction or production. Secondary and tertiary human activities also make demands on the land in various ways, both as suppliers of environmental goods and services as well as for their physical location. Indeed, human activities ere, for the most part, land based, and thus, the occupation of the land is bound up with the physical structures that make up rural and urban settlements; industrial complexes; transport networks; public works and others.

8. It is thus clear that when we speak of land resources, particularly from the point of view of management, we are referring to an extremely complex system that relates not only to many of the environmental issues considered by the preparatory process, but also to a significant portion of human and economic activities. Thus it concerns protection and management of soils, water and forests; the conservation of biodiversity; developmental and productive processes; the management of human settlements; human activities along coastal areas; the management of toxic chemicals, solid and hazardous wastes; last, but not least, questions linked to weather, climate and global change.

Causes of land degradation

9. Among the most important causes of environmental deterioration is the increasing pressure on resources caused by patterns and increasing rates of consumption and increasing numbers of people. In these circumstances, conflicts in the use of land and resources intensify. The main conflicts are between developmental and environmental requirements, in particular, how to satisfy human needs while at the same time protecting the environment for

future use; between competing land uses; between the interests of individuals, specific groups and society as a whole; and between the requirements of immediate and long term needs. These problems are exacerbated if the land is being used for purposes to which it is not well suited.

10. Another factor directly implicated in land degradation is the present institutional, economic and social system, and the cultural perceptions that shape it. Institutions have tended to operate along strictly sectoral lines, taking little account of linkages and interactions. This is a sharp departure from traditional systems of land management that took an integrated view of the land and of the social and economic functions that it performed, and were less dependant on specialized approaches. Modern economic thinking and processes have tended to concentrate only on the quantifiable aspects to which a direct price can be attached, thus excluding environmental factors and services. Land and natural resources have not been valued sufficiently as part of the economic equation that also includes capital and labour, resulting in exploitation of the resource base beyond its capacity for renewal. Social systems have not always ensured that equity and full participation of all stake holders is ensured. In this connection, poverty and imbalances in land tenure have negative impacts on both the resource base as well as on the development process itself.

The main linkages

11. To highlight the main areas of conflict and the factors which have an influence on and are in turn influenced by use of land resources, it is useful to examine how the land system interacts and "links" up with other factors. The main linkages between land resources and the various environmental, economic and social factors that are important in the environment/development interface are set out below. It should be kept in mind that, in describing the linkages under three categories, it is understood the interactions are more often systemic than linear.

12. The most important environmental linkages for land resources include: atmospheric processes, in terms of the impacts of weather and weather events such as drought on land productivity; the possible effects of climate change on ecosystems; the effects of ozone destruction and air pollution on biological productivity and health of people and ecosystems. Processes and environmental degradation that affect ecosystems (such as soil deterioration, deforestation, loss of biodiversity, deterioration of water bodies) are all of particular import, as they affect the fabric and functions of land resources. Pollution by toxic chemicals and hazardous wastes, whether it originates in activities connected to direct use of land resources (agriculture) or whether it arises because of use of land as a disposal site (waste dumps) is linked directly with the quality and productivity of land resources.

13. The most important linkages of land resources with economic activities and the economic sector include: in the primary sector, agriculture, fisheries, forestry, water supply, and mineral extraction. In the secondary sector, infrastructure, public works and settlements have an important impact; and various branches of the manufacturing and service industry have important links with both land resources as well as with the primary economic

activities. In the tertiary sector, tourism and recreation are directly linked to land. Economic goals and policies at the national level have important implications for land and natural resource use: the effects of investment policies, export and trade policies both nationally and as they interact with the international economic environment in both direct and indirect ways.

14. The linkages of land resources with social and political issues are numerous and of great importance. Among the most crucial are the population/resources/technology interface; equity in the access to and consumption of resources which in terms of land is closely bound up with land tenure; the role of specific groups in management of land resources, in particular women and indigenous populations; the quality of life and of the living and working environment; satisfaction of basic needs, including for shelter, health and food security; poverty and its effect on land, particularly as it displaces people from productive land and forces them to use marginal environments; environmental security, as it is conditioned by conflicts over resources.

15. The main purpose in identifying these linkages is to highlight the types of factors that must be considered in the protection and management of land resources. These linkages are not always obvious nor direct, but operate in a manner that is sometimes far removed from the source. Furthermore, the exact type and nature of the linkages is situation and place specific, and must therefore be clearly identified in each case.

The rationale for an integrated approach

16. From the brief review above, it follows that when we speak of land resources, we are referring to a very large segment of the environment, and when we examine the linkages between land resources and the economic and social spheres, we are dealing with the most important aspects of the development process. We are in fact dealing with a complex system, that, to be understood and managed effectively, must be dealt with in its entirety. To do this, to take account of all the factors involved, and of all the linkages it is necessary to apply an approach that enables considering the dynamic interactions and impacts of different choices, and which allows making the best use of land while reconciling differing requirements and making the best trade offs between them. Such an approach provides the supportive framework where policy, planning and management decisions and actions can take place.

17. Integrated land management is an eminently practical way of linking social and economic development with environmental protection, thus helping to achieve the objectives of sustainable development. It offers, among other things, a positive way of responding to the requirements of sustainable use of land resources by: providing a framework within which to examine and act on the links between the various economic, social and environmental factors involved in land management; allowing informed political and administrative decision making, based on a full understanding of the implications of different land use patterns; promoting more efficient land use and distribution of human activities and population and reducing inequities in access and use of land.

III. THE ELEMENTS OF AN INTEGRATED APPROACH TO LAND RESOURCES

General considerations

18. An integrated approach to land resources is not intended as a rigid planning and management system. Rather, it seeks to provide a coherent and holistic package, that brings together the various elements that can assist in using land and natural resources in a sustainable manner. This package is embodied in a participatory process and supportive structures that address the policy, planning and management aspects of land resources. While its intent is integrative, particularly at the policy and macro planning stages, at the management stages the approach will continue to be sectoral, albeit with full coordination. To be fully effective, the approach must be an integral element of the national development strategy. But a word of caution is necessary: this approach cannot by itself ensure sustainable use of land and natural resources; this can only come about through a radical rethinking of the development process and the role of land within this process. Land and natural resources must be recognized for what they are: scarce resources, and the basic capital on which development is based.

19. The core of the approach is to determine the most appropriate uses, based on land capability, and to make the most efficient tradeoffs between competing uses and requirements: in brief, to optimize sustainable use of land. To achieve this, it must be flexible and responsive to local conditions and needs; it should be participatory,involving people, the users of land, at all stages of the decision and implementation process. The strategies derived from such an approach should be forward looking, adaptive to changing circumstances and be based on the precautionary principle. The challenge is multiple: how to achieve the appropriate mixture of regulatory and market mechanisms, how to free social creativity, how to satisfy the need for economic development while protecting the resource base, and how to balance the requirements for social equity with both individual and communal needs. This approach will be particularly useful in situations of stress, such as fragile ecosystems in arid or coastal areas or mountains, or in areas of acute conflict, for example around protected sites.

20. The elements that make up this approach are briefly described in the overview that follows. The main emphasis of the approach is at the policy level on the one hand, and the planning and management process on the other. An important complement are the tools to support planning and management. Some of the specific components are described elsewhere in greater detail in other documents before the Preparatory Committee. The various elements reviewed are presented, for convenience, in three clusters.

A. The basis of decision making: the policy level

(i) guiding principles for sustainable development of land resources
(ii) goal setting and policy formulation
(iii) institutions and policy instruments
(iv) the decision making context
(v) the integrative planning and management frameworks

B. The land resources planning and management process

(vi) definition and analysis of the system
(vii) choice, assessment and review of the options
(viii) definition and implementation of the plan
(ix) monitoring, evaluation and feedback

C. The tools for planning and management

(xii) the assessment process
(xiii) analytical tools
(xiv) management practices

A. THE BASIS FOR DECISION MAKING: THE POLICY LEVEL

21. There elements that underlie decision making and are directly relevant to land resources, and described below. Most of them are also common to decision making for any aspect of development.

Guiding principles

22. The concept of sustainable development is the principle that underlies integrated land use planning. By defining the operational content of sustainability, in terms of its social, cultural, political, economic and environmental dimension, it is possible to provide both the bounds of and the strategic directions along which the development process must move in order to be sustainable.

23. Attempts to date to define the guiding principles for sustainable development have emphasized that it must be economically progressive, socially just, culturally acceptable and environmentally sound. Where there has been less progress is in defining indicators of progress in achieving sustainability of land use and of the development process itself. These indicators are essential if the process is to be steered in the right direction.

24. Specific principles for use of land must be based on the premise that virtually all human basic needs are met by the land, but that this primary resource is finite and fragile. Land degradation affects not only primary productive activities such as agriculture and forestry, but also other sectors of the economy such as the commercial and manufacturing sectors. As population and consumption rise, land per capita becomes increasingly limited and must be managed with ever greater care. Thus, the emphasis should be on conservation for sustainable use, articulated around protection, rehabilitation and management for development. Present land use should be compatible with its potential and not preclude future productive uses. Against this backdrop, the following could be singled out as some of the important principles for the protection and management of land resources:

* ensuring that human needs are met within a more balanced physical and regional pattern of development in relation to natural resources and social needs. This means, among other things that a better distribution of people and economic activities is achieved;

* managing the land to maintain, improve and rehabilitate its integrity and productive capacity; this means, among other things that sloping land must be protected against erosion, nutrient status must be maintained by use of adequate cultural practices; climate limitations must also be recognized;

* occupying and using the land, so far as possible, according to its inherent capacity and ecological suitability, thus prime farmland and land of unique value would be conserved and new urban and industrial developments, which are in fact irreversible, would be sited on land that is not critical for other desirable uses;

* minimizing the loss of special land forms and systems and productive land; this means, among other things that special landscapes (including cultural landscapes and monuments), habitats and centres of biological diversity must be protected;

* using renewable natural resources, such as forests and wildlife, at rates that do not exceed their capacity for regeneration (sustainable yield);

* maintaining the diversity of ecosystems and species, including genetic diversity within species; this means that habitats and wildlife must be protected and that variety in cultivars must not be lost;

* assessing and preparing for predictable hazards means that such natural hazards as drought, floods and landslides should be taken into account and mitigating measures and contingency plans set in place at the earliest stage of land use;

* disposing of wastes in such a manner that the assimilative capacity of the local or global ecosystem is not exceeded; this means that waste production must be kept to a minimum and recycling of materials for reuse increased.

25. For these basic environmental principles to be applied, they must be in harmony with social and economic needs. Use of land must respond to the needs of improving the quality of life of rural and urban people, ensuring food security, proper nutrition and an adequate living and working environment. Land use must also ensure equity in the access to and enjoyment of the products of the land; conflicts between competing groups and individuals must be resolved. In economic terms, the principles of viability and optimum efficiency should be followed, matching different land uses in different areas to obtaining the greatest sustainable benefits at the least cost.

26. But it is clear that some of these principles conflict with each other in specific situations. For example, protection of particular environments or land forms may be in conflict with the immediate development needs of the

populations that live there or with industrial interests. Investment in a poor region, or in a marginal environment may well appear to be less efficient or profitable than investment in an area that is better endowed. How these conflicts are eventually resolved is essentially political, and in that case, decisions must be made on the basis of informed consensus as to the overriding principles that should be adhered to. In many cases however, a responsive planning process, use of appropriate technologies and diversification of economic activities that do not put direct pressure on the land can help in reducing the costs of trade-offs. Ultimately, there is no real contradiction between high levels of industrial development and stringent policies on land: destroying the land is as inefficient as it is counterproductive.

Goal setting and policy formulation

27. Integrated land management must begin with the establishment of basic goals which address the social, economic and environmental factors involved in use of land resources. Goals can and should be formulated at various levels, both in broad terms which reflect the long-term aspirations of society, tempered by awareness of environmental and economic constraints and opportunities, as well as in specific terms relevant to particular issues. They should be based on the best available information related to the issues under consideration. They should be thoroughly worked out and expected to remain valid for long periods of time. On the other hand, they cannot be pursued blindly in the face of fundamental economic, social and environmental change. Goal setting is a political process, and should be led at the political level, while ensuring the full participation of all stake holders, at all levels of society. Setting goals determines the nature and intent of all subsequent steps, ensuring intra and intersectoral consistency.

28. Policy formulation for land use is the process of broadly defining the pathways and strategic directions for achieving long term goals in respect of land and natural resource use and creating the means and mechanisms to support this process. This involves establishing institutions to deal with various land use issues and defining their responsibilities, be it at the national or local level; enshrining basic principles for land use in the law and establishing normative measures, regulations and standards; the use of economic, financial and fiscal instruments to create a favourable economic environment for reaching the goals of more efficient land use; establishing and enforcing procedures that support and facilitate democratic participation in decision making and implementation in all matters concerning use of land. These various policy instruments by providing a mix of norms and incentives, allow in theory to cover most of the aspects that determine land use. However some of the provisions present contradictions among themselves as, in most cases, they evolved without the explicit objective of ensuring the most appropriate and sustainable use of land. An important effort is needed therefore to revise them to ensure that these objectives are met. Another problem is that many of these policy instruments are not usually consistently nor comprehensively applied.

Institutions and policy instruments

29. Institutions to support land use and natural resources planning and management should ensure the integration and coordination of all the

specialized technical and sectoral components (e.g. forestry or water supply) in a comprehensive framework that also includes social and economic factors. This can best be done by establishing a clear hierarchy of responsibilities for national, regional and local land use, using flexible mechanisms for coordination, collaboration and interdisciplinary work, and decentralizing responsibilities to the appropriate level. This type of structure should be supported by mechanisms for consultation and involvement of all actors.

30. In most cases, current institutions are not overly responsive to this imperative. The fact is that probably nowhere is there a clear cut and rational system for land and natural resources planning and management. The need for integrative approaches and coordination has been much discussed. Various legislative committees, ministries, interdepartmental committees, ad hoc task forces, land use planning boards have been set up to facilitate this process. Yet the sectoral approach to management of the environment, natural resources and land continues to dominate. There is fragmentation and lack of coordination at both the vertical and horizontal level. This occurs because of a cultural bias that disciplines, careers and reputations are closely tied to sectoral institutions. National bodies reflect this state of affairs and shape international institutions, which in turn reinforce national structures. This drive to preserve the status quo is an important barrier that must be surmounted, again through raising awareness and through the creation of institutions that can bridge the transition.

31. The main function of legislation and regulatory mechanisms in respect of land and natural resources should be to ensure that use is in accordance with land capability and serves the broader interests of society according to the principles of sustainability. The body of laws and customary practices will give normative directions, set limits, establish obligations and rights of all actors - the state, the community, groups and individuals - in respect of the use and access to land and natural resources. A particularly important aspect is to harmonize public, private, customary and international laws to support sustainable land use. Regulations concerning development, changes in land use, management and protection measures, emissions and disposal of wastes on land, specific procedural questions are important elements to be considered. The question of ensuring access of particular groups of people, such as women and indigenous peoples, which might not be sufficiently safeguarded by more general legislation also needs to be given careful attention. A particularly difficult area is the regulation of the use of common property resources, particularly in the case where there are grey areas between customary practices and formal legislation. This applies to both the national and international levels. Legislation should support traditional practices of common property use, unless there have been fundamental socio-economic changes which render these traditional systems inoperable.

32. There is considerable experience in legislation related to land use planning and use of resources, embodied either in general legislation or enshrined under more specific environmental legislation. But,there has not been, to date, a widespread preoccupation to formulate laws and regulations with the explicit function of ensuring sustainability of land and resource use. This is something that needs to be done. Furthermore, only a few countries have a truly comprehensive body of legislation in this field that is

consistently complied with; this shortcoming also needs to be remedied. Some legal principles could be examined further, because of their potential to support a more sustainable development process. An example here is that of the social obligations inherent in ownership and how commonly accepted principles could be harnessed to actively support better use of land.

33. Economic instruments can be an efficient and flexible way of 'internalising externalities' and ensuring better and more sustainable use of land and resources. On the other hand, improperly applied, they can be an incentive to unsustainable land use. These instruments can be grouped in two major categories. First, those that directly support specific policy objectives concerning land use, and include general financial and fiscal support measures; pricing policies; subsidies and incentives; performance bonds. Second, those that act indirectly through market mechanisms and include charges, fees and taxes; tradeable permits and other mechanisms of this type that can support specific aspects of land and resource use. These instruments should be used carefully to minimize market distortions that might encourage economic and environmental inefficiencies in resource use, but at the same time supporting social policy goals such as equity and balance between groups within society. A more extensive discussion of these instruments is presented to the Preparatory committee elsewhere.

34. There is some debate on the use of these instruments, in particular, on the role of regulatory interventions vis-a-vis systems of incentives and disincentives that allow the market to operate freely. This debate is not resolved, but experience is very rapidly building up, to reveal the most appropriate manner in which each of the two sets of approaches can be applied, and how they could best be combined to support a sustainable use of land. Many instruments have not been explored fully, and it would be useful to do this. An example that comes to mind is the use of land and resource use charges, levied according to land capability and land use.

35. Mechanisms for ensuring citizen participation can effectively fulfil two policy goals, namely that all members of society are active in the development process, and that better land use is ensured, by allowing a better balance and trade offs between different interest groups. Participation can and should take place at all levels: nationally, through the democratic process, regionally through institutional procedures that support various types of participation, ranging from being informed to actually shaping decisions, and locally, through direct participation.

36. Land use is very much in the hands of myriad individuals, with different needs and constraints. Participation and collaboration is the only way in which these differing needs and constraints can be harmonized and the most efficient and equitable trade-offs made. Mass participation ensures the transparency of decisions in respect of land use, as they affect the common good and also provide a measure of accountability for all the players and stake holders in land use decisions.

37. While participation is almost universally accepted as a necessary and positive thing, in actual fact, full participation is far from being the norm. From the failure of the democratic process in some communities, through

to the practical difficulties of involving large numbers of people in decisions and action, the record is not good. Among the most negative influences that limit participation are cultural attitudes that favour the exclusion of groups on the basis of class, racial, ethnic or gender affiliations; elitist tendencies of technical and professional disciplines; weaknesses in social organization and organizational knowhow. The solutions to these problems lie, more than anything else, in the political will to correct them.

38. An essential complement to public participation is that of awareness raising. Awareness should be created at the level of the individual citizen through various channels, including special campaigns, extension services and the media. Emphasis should be placed on the causes and dangers of land degradation and the benefits to be derived from the adoption of sound management practices at the individual level, as well as of broader social criteria for land use. This awareness must also be supported at the level of communities and associations, and last, but not least, at the level of decision makers and professional bodies, which should be alerted to the need and benefits of mass participation.

The decision making context

39. Decisions are made at various different levels and scales. At each of these levels and scales the factors to be considered will vary as will the methods of analysis and complexity of information needed to reach decisions. Likewise, the tradeoffs that must be made and the magnitude and breadth of impact arising from those decisions will vary. Different constraints and opportunities exist at each step of the processs of decision making which must be exploited and mitigated in the appropriate manner. It is precisely because of these interactions between the effects of decisions that a comprehensive and integrated view of the process is so important.

40. The most important levels where decision making occurs take place around a hierarchical structure. Each level provides the framework within which decisions for the successive levels must be taken, in descending order of breadth. The most important levels include:

* the level of policy and strategy, where decisions are made in respect of national development goals, priorities for achieving them and methods for harmonizing their social, economic and environmental dimensions;

* the tactical level, where decisions concerning specific planning and management are made and institutional arrangements defined; at this level, sectoral programmes need to be harmonized and integrated into comprehensive packages that incorporate specific tradeoffs;

* the operational level, where all the provisions are made for implementation, follow-up and evaluation.

41. The scale (or level in the institutional sense) of decision is likewise important. At each ascending level, decisions at the lower level will condition the situation at the higher level according to a cumulative and synergistic pattern. The most important scales of decision making include:

* the level of the individual citizen, farmer or developer is of paramount importance; here innumerable decisions are made on use of land, choice of crops and cultivation methods, the placing of buildings; all of which have social, economic and environmental implications for their own welfare and for others; tradeoffs are made exclusively on the basis of individual interests; many of these decisions have cumulative and synergistic effects far beyond this level;

* at the local level, be it that of the village or municipality or similar basic organizational unit, decisions are made on the layout of infrastructure and various activities of local communal concern, such as irrigation and drainage works; it is here that traditional patterns of land use are shaped; tradeoffs are usually made on the basis of advantageous personal exchanges within the community;

* at the district, provincial or regional level or similar subnational organizational unit, decisions on land use come to grips with the diversity of the land and its suitability for different uses, for example siting of new settlements or protected areas, or large forestry reserves; decisions are made on the basis of comparative advantages and exchange values; impacts on both the overall use of land as well as on the economic sphere are important;

* at the national level, the most important decisions in respect of land use are made, which determine overall land and resource use and must resolve conflicts of competing demands on issues of national interest in respect of various economic sectors including decisions on agriculture for food or cash crops or siting of industry; these decisions are shaped as much by direct policies on use of land and natural resources as by more general economic and trade policies and the international economic environment; tradeoffs are made on the basis of national interest and comparative economic advantages;

* at the international level, agreements on shared, transboundary or common property resources affect national land and resource use; conflicts that arise at this scale tend to be more difficult to resolve; it should also be noted that, eventually, all the collective individual, local, district and national scale decisions on land use have an impact globally; for example, local decisions on forest cover will have an impact on global climate.

The integrative frameworks

42. There are a variety of conceptual and action oriented frameworks that attempt to integrate the issues concerning the environment and developmental aspects. Although they are different in terms of the emphasis they put on environmental, social, cultural and economic aspects, they all share the overall objective of harmonious socio economic development. These frameworks have evolved through time, putting increasingly more emphasis on the sustainability of the development process. The examples below are merely indicative, and in no way attempt to provide an exhaustive list.

43. The concept of planning zones, arranged around areas that are homogeneous in terms of various environmental and other characteristics, are a useful support for planning the use of land resources. These natural units should be, for practical purposes, linked to political and administrative divisions; in many cases, it would be useful to actually redefine these subdivisions to conform with the natural units. The basic planning zones include:

* the ecosystem, in which the land and all the resources and elements that form it are considered as a system. The ecological interactions and specific common conditions that shape the particular constraints and opportunities that must be faced are the main emphasis. A series of ecosystem classifications exist; they include major critical ecosystems, which include drylands and other areas of uncertain rainfall; irrigated farmlands; humid and perhumid areas; mountains and hilly areas; coastal zones and small islands. There are other classifications that differentiate between biogeographical provinces and ecosystems and include major groupings such as forests, deserts, grasslands, mixed mountain and highland systems, mixed island systems and lake systems. Within these broad categories there are various subcategories, amounting to dozens of distinct ecosystems;

* the agro-ecological zone (AEZ) system is based on the agricultural production potential and the population supporting capacity of the land and allows consideration of common management systems. This type of system is backed by a considerable amount of useful data on population, socio- economic data, data on resource use and productivity, land use patterns, environmental constraints and opportunities and others. Classification is based on moisture and rainfall pattern and temperature and solar radiation, usually aggregated in seven major agroecological units: warm seasonally dry tropics; warm humid tropics;cool tropics; warm seasonally dry subtropics with summer rainfall; warm/cool humid subtropics with summer rainfall; cool subtropics with summer rainfall; cool subtropics with winter rainfall;

* the watershed or water catchment basin, which constitute basic physical units for land and water management based on the unifying characteristics of water flow; watershed often include a variety of ecosystems, and all the areas along the watershed, from mountain, to coastal ecosystems; this type of land unit is the one most often used in land use planning, because it also coincides, in many cases, with economic and political divisions;

* the protected area and biosphere reserve system, which ranges from pristine natural areas to those that are managed for productive purposes and where both conservation and sustainable use is promoted; the first category covers some 4.500 areas at the national level; the second category has 300 reserves in 75 countries, linked up in an international network;

* sustainable development zones have also been proposed; which attempt to establish areas that combine protection functions with sustainable development; national development parks are a similar concept.

44. A wide variety of approaches to socio-economic and environmental development variously stress developmental and environmental goals in different mixes. These approaches also vary in terms of their scale of applicability, from the local to the national and even global level. Some of the broader frameworks stress a holistic approach to development and environment, with an emphasis on sustainability; they also provide the elements for analysis, planning and management, as well as a direction for policy changes. The most important characteristic of these approaches is that they promote working with the system, working in a partnership with the local environment to satisfy the developmental needs of people. These frameworks include:

* integrated rural development is directed to the management of the resource base for productive purposes while at the same time answering the basic needs of the local population;

* sustainable livelihood systems, is a similar framework that puts emphasis on providing people with gainful economic activities that will allow them to satisfy their needs in a sustainable manner;

* ecodevelopment stresses economic development based on the environmentally sound management of local resources, in harmony with local cultural values;

* primary environmental care (PEC), fashioned after the concept of primary health care, is directed to meeting basic human needs, caring for the environment and empowering communities;

* sustainable development zones are based on a concept similar to that of biosphere reserves, but include development activities; this concept is almost identical with that of regional (development) parks, but stressing the concept of sustainability explicitly;

* conservation for sustainable development strategies, modelled after the World Conservation Strategy and the associated national strategies put an emphasis on living resource conservation for sustainable development; the successor strategy, Caring for the World has expanded the emphasis to include stronger economic, social, cultural and ethical components.

B. THE LAND RESOURCES PLANNING AND MANAGEMENT PROCESS

45. The basic planning and management aspects of an integrated approach to land resources can be subsumed under the established procedures for land use planning or physical planning. By their very nature, these procedures are integrative and non sectoral, even if in the end, programmes will be designed and implemented for the most part along sectoral lines, given the reality of present disciplines and institutions. The process is scale independent in the sense that the area where the procedures can be applied will vary in extent, from a village area, to the national or even regional or continental scale, but always following the same general pattern. The actors in the process will always involve the users of land, the decision maker and the planning and management team.

46. The planning and management process can be described as a cyclical process composed of a series of steps in a logical sequence that includes setting of objectives and area of intervention; definition of the planning assignment; in depth analysis of the system; identification and appraisal of options; choice of possible action packages; assessment of possible impacts of chosen action package; readjustment of action package; definition of the final plan and implementation; monitoring,evaluation and feedback. These steps are not always clearly separable or sequential; they often require iteration and feedback between the different steps. Since there is no such thing as a tabula rasa, many of the steps in the process will overlay decisions that have been taken in the past. The sequence of steps can be applied in essentially the same manner regardless of the scale and area of intervention, be it local, district or national scale.

47. While decisions to embark on an integrated planning and management process are largely reactive, the process should become increasingly proactive. In the face of the possibility of global change, it is most important that flexible adaptive strategies be set in place. It is worth noting the problematic fact that most plans for land use currently being developed assume conditions - for example of climate and vegetation - that will probably no longer exist in the decades to come. Yet the plans involve changes in land use and investments in infrastructure that are permanent. This is perhaps the most important policy issue that must be considered and the most difficult to resolve in the face of uncertainty.

Definition and analysis of the system

48. This step in the planning process is essentially to set the stage for subsequent action, defining the system of intervention in very broad terms. The planning assignment id defined carefully, delimiting the planning area, establishing objectives and criteria by which decisions will be made; any special constraints (for example tenure patterns or institutional inadequacies) will be identified. The scope, period, general content and operational questions should also be reviewed at this stage also, including ensuring that all the necessary inputs to carry out the planning assignment are available.

49. One of the most important inputs to the process is information on the system or area of intervention as well as more general data on the broader context within which the chosen planning area is situated. It should cover as a minimum, information on the natural environment; trends in use of environmental goods and services; production methods and technologies, patterns and trends; land use patterns including for primary production, infrastructure, settlements, industry; transport and communications; human population profiles including status of different groups and social organization; economic activities including types of activities and employment and income patterns; capital availability and investment patterns; administrative structures and institutions; legal framework and regulations on use of land and resources; general contextual data, including macroeconomic and social data.

50. On the basis of existing information, the system and area of intervention can be modelled and analysed to determine the basic factors and in particular the manner in which they interact. Of particular importance here is the issue of evaluating ecosystem characteristics and land suitability. This involves, among other things, assessing land quality and determining the limiting values. In this manner, problems and opportunities can clearly be identified and the most important issues and areas of conflict highlighted. A series of tools and techniques for analysis are available that can facilitate this process of analysis.

51. The definition of very precise environmental and developmental objectives will assist in pinpointing the types of actions to be carried out. This will involve, among other things, setting multiple function objectives, and a process of optimization to maximize the possibility of reaching the desired developmental goals. The development and utilization of a decision support procedure to integrate the various socioeconomic and environmental factors is essential. It should be noted that techniques in this area are not well developed, particularly in terms of integration of socio-economic and environmental objectives.

52. The identification of the possible action and management options, land use types and production systems that can assist in reaching the desired objectives is the final step of this initial stage. As the mai emphasis here is on use of land, emphasis will be placed on matching development options with environmental potential by selection of the most appropriate land uses and management techniques. This, however, should be complemented by consideration of a series of non land use options such as the development of non resource based activities, movement of population and others.This process should be rounded out by identification of institutional, legal and other complements to the actions, as well as various tools, technologies and management methods; relevant inputs and delivery systems and total costs must also be identified.

Choice, assessment and review of the options

53. Following this detailed analysis of the system and the identification of a range of possible options for action, a choice can be made of the package that will most effectively help in achieving the desired objectives. The package chosen should then be vetted for its possible impacts. A variety of techniques are available, and can assist in determining not only costs and benefits in the social, economic and environmental spheres, but also assess possible risks.

54. Having determined the possible effects of the action package, it is then possible to introduce adjustments where necessary. Attention to minimization of negative impacts and increasing efficiency is important. The introduction of corrective measures, or, where this is not fully possible, mitigation measures should take place at this time.

Definition and implementation of the plan

55. The revised and corrected action package must then be put in a form that can be effectively acted upon. The plan has to provide the direction needed

to fulfil the desired objectives as well as make provision for all the prerequisites and support measures necessary for implementation. Without this, the planning exercise will have been a wasted opportunity.

56. The prerequisites include, at the first level putting in place the conditions for adoption and acceptance of the plan by those affected; second, it requires clear definition of responsibilities; competent personnel, mechanisms for public participation, financial resources, support services, supplies and materials and various other organizational and logistical requirements. Broader support measures will include legal, institutional provisions; the application of economic and fiscal measures and the creation of appropriate mechanisms for continuous public participation in the entire cycle of management and implementation.

Monitoring, evaluation and feedback

57. Too rigid a plan is bound to fail. Even with the best intentions and the most careful planning process, there are bound to be imperfections in the plan, or unforseen events may occur. Therefore, it is essential to build in mechanisms for monitoring progress, conducting evaluation at regular intervals and feeding the results back into the action package being implemented. The advantage of this procedure is that a very valuable body of experience is built up. Over time, precise indications on the sustainability of actions can be given operational validation.

C. THE TOOLS FOR PLANNING AND MANAGEMENT

The assessment process

58. An integrated approach to land resources depends on the availability of the appropriate information, the means to analyze it and present it in a manner that is appropriate to decision making. The use of the most up to date information and the most modern technology and methods for obtaining and processing the information is useful; however, even with a system that is not at the cutting edge, but uses simple elements already available or in place locally, can significantly improve decision making.

59. Information needed will refer to a broad variety of subjects, including environmental, social and economic data in their broadest meaning. In terms of land resources, the basic environmental data are of paramount importance and will cover such issues as the status and change of natural resources and basic ecosystem components (for example soils, forest cover wildlife, water, climate); ecosystem forms and land capability. Environmental data will also include the changes and effects produced by human action, including land use patterns and location of infrastructure and settlements; effects of pollution in ecosystems as a whole and in specific elements such as air and water. Social data will include such broad categories as population data, prevalence and incidence of diseases, consumption patterns as well as more specific data to be used in particular situations, such as cultural attitudes and practices relevant to land resources. Economic data will include not only data on economic activities as a whole, including performance indicators and such like, but also data on trade patterns, economic policies and other relevant

information. The sources of this information can be varied, ranging from remote sensing, monitoring, inventories, national statistics, research studies, map based information and others. There are various ways of managing these data including through publications, maps and statistical tables; bibliographies; referral systems and computerized databases.

60. Assessment is the end point of the data collection and management process, where informed interpretation of the data takes place. There are a variety of methods for manipulating and interpreting data that are relevant to land resources. One of the most useful is that for combining and correlating various types of specially relevant information. This can be done through simple overlay techniques or through more sophisticated methods, such as Geographic Information Systems, Other methods that allow correlation of more complex type of information include, expert systems, development of scenarios.and simulation modelling. Many of these techniques are still fairly new as a true support to decision making and are also not always very accurate. However, they allow to analyse and interpret interactions and permit the simultaneous consideration of a variety of disparate data.

Analytical tools

61. A series of methods exist to analyses the costs and benefits and the impacts of particular actions. Other methods also exist for assigning value to environmental goods and services. These methods are a very useful support to decision making. Among the most widely applied are impact and risk assessment, cost benefit analysis and accounting. The origins of some of these methods are in economic analysis while others have originated from the environmental management field. There is now a movement to cover as wide a spectrum as possible, either through integration of both economic and environmental factors, or to transfer techniques to the other field, for example, transferring the techniques of economic accounting to accounting of natural resources. The question of cumulative and synergistic effects is also receiving increasing attention.

Management practices

62. There is a large repertoire of management practices and methods that refer not only to the specific issue of land and natural resources, but also to the economic field and those of social or managerial organization. Because this is such an important topic, the very stuff of which sustainable development is made up of, it merits treatment at length. As this is not possible in a short paper such as the present one, only very general points will be made here. It is understood that this topic must be given full attention elsewhere. These practices are continuously evolving and improving. It is important however that in a drive for modernization, traditional practices, which show a great sensitivity to both social and environmental aspects, should not be lost. In effect many of these traditional systems, which have evolved through centuries, and sometimes millenia, have a deep understanding of both the environmental as well as social aspects of land use, and have much to offer. Suffice it here to mention some management techniques as an ilustration.

63. For example, one could mention management techniques that refer to a specific element of land, such as soils could include guidance at the policy level, such as that offered by the World Soils Policy and World Soils Charter; or it could involve special conservation techniques, such as terracing or contour plowing; or it could involve special cultural practices, such as no till agriculture. Larger components of environmental systems, such as wildlife or watersheds can also be dealt with at the management level in various ways. Other management systems refer directly to production practices, such as aquaculture, agroforestry or organic agriculture systems.

Conclusions

64. All the various elements described can be made to work together, but there must be the political will to institute a holistic approach to land resources. To achieve this, it is essential to raise public awareness of and develop popular support for integrated land management systems, dispelling legitimate concerns about the feasibility and desirability of applying such an approach. The high degree of planning and management involved, may seem dauntingly difficult and may also appear to promote too much social control. On the other hand, there are also concerns that land is not being used efficiently, and that current practices lead to deterioration and must be changed.

65. To institute an integrated approach to the planning and management of land resources it is necessary to build on what exists and develop promising approaches further. Most of the effort must be done at the national level, but the international community has an important support role to play. Some of the options for action are presented in the proposals for Agenda 21.

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